THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 27

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte NAOKI TAKEYAMA, HIROMI UEKI, YUJI UEDA, TAKEHIRO KUSUMOTO, and YUKO NAKANO

Appeal No. 1997-2209
Application No. 08/179,196

HEARD: May 16, 2000

Before PAK, OWENS and DELMENDO, Administrative Patent Judges.
DELMENDO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1, 5 through 9, 12 through 33, and 36, which are all of the claims pending in this application. Claims 23 and 30 were amended and claims 34 and 35 were canceled subsequent to the final Office action in

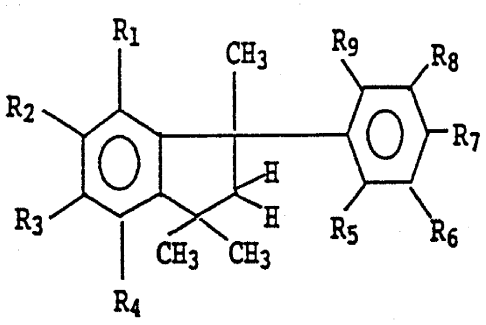
the "Second Response to Final Office Action" filed September 16, 1996 (Paper No. 18), which the examiner entered.

The subject matter on appeal is directed to a positive photoresist composition which includes: (i) a copolymer of p-vinylphenol, p-t-butoxycarbonyloxystyrene, and styrene, which satisfy the relative ratio limitations recited in appealed claim 1; (ii) a dissolution inhibitor of formula [II] as recited in appealed claim 1; and (iii) a photo-induced acid precursor (brief, page 3). This appealed subject matter is adequately illustrated by independent claim 1, which reads as follows:

1. A positive photoresist composition comprising an alkali-soluble resin containing a copolymer of p-vinylphenol, p-t-butoxycarbonyloxystyrene and styrene; a dissolution inhibitor; and a photo-induced acid precursor, wherein the number of p-vinylphenol (m), the number of p-t-butoxycarbonyloxystyrene (p), and the number of styrene (n) satisfy the following conditions:

(m + p):n = from 50:50 to 95:5 and
p:(m + p) = from 1:50 to 45:50; and

wherein said dissolution inhibitor is a compound represented by the following formula (II):



(II)

wherein R_1 to R_9 each represents a member selected from the group consisting of a hydrogen atom, an alkyl group, a t-butoxycarbonyloxy group and a hydroxyl group, provided that at least one of R_1 to R_4 is a t-butoxycarbonyloxy group and at least one of R_5 to R_9 is a t-butoxycarbonyloxy group.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Murata et al. (Murata)	5,332,650	Jul. 26, 1994 (filed Sep. 4, 1992)
Urano et al. (Urano)	5,350,660	Sep. 27, 1994 (filed Jan. 28, 1991)
Sinta et al. (Sinta)	5,362,600	Nov. 8, 1994 (filed May 25, 1993)
Ueda et al. (Ueda)	5,397,679	Mar. 14, 1995 (filed April 9, 1993)
Yamanaka et al. (Yamanaka)[1] (published European patent application)	0 541 112 A1	May 12, 1993

[1] Yamanaka is also referred to as “EP ‘112” in the examiner’s answer. Consistent with the appeal brief and the listing of the prior art on page 5 of the answer, we use “Yamanaka.”

The grounds of rejection for our review in this appeal are as follows:

(1) Claims 17, 23, 26, 31 and 32 stand rejected under the second paragraph of 35 U.S.C. § 112 as indefinite;[2]

(2) Claims 1, 5-9, 12, 13, 15, 16, 18-33, and 36 stand rejected under 35 U.S.C. § 103 as unpatentable over Urano in view of Sinta and Murata, and further in view of Yamanaka; and

(3) Claims 14 and 17 stand rejected under 35 U.S.C. § 103 as unpatentable over Urano in view of Sinta and Murata and further in view of Yamanaka, as applied to claims 1, 5-9, 12, 13, 15, 16, 18-33 and 36, and further in view of Ueda.

We have carefully reviewed the entire record, including the specification, the claims, the applied prior art references, and all of the arguments advanced by both parties. As a consequence of our review, we are constrained to reverse

[2] The examiner withdrew the rejection under 35 U.S.C. § 112, second paragraph, of claim 23 for lacking proper antecedent basis for the phrase "R^{10} is an alkyl group" and claim 30 for being dependent on canceled claim 4. In addition, the examiner withdrew the objection and rejection under the first paragraph of 35 U.S.C. § 112 set forth in paragraphs 18 and 19 of the final Office action (answer, page 3).

all of the aforementioned rejections. Our reasons are set forth below.

We consider first the examiner's rejection under the second paragraph of 35 U.S.C. § 112. According to the examiner, claims 17, 23 and 26 are allegedly indefinite because definitions for the phrases "a lower alkoxy group" in claim 17, "a lower alkoxy group" in claim 23, "a lower alkyl group" in claim 26, and "a lower alkoxy group" in claim 26 are not included in the specification. The examiner has taken the position that these phrases do not have fixed meanings in the art, as evidenced by Sinta (column 7, line 54; column 9, lines 50 and 51) and Urano (column 2, lines 65 and 66; column 7, line 20), and that in the absence of a standard for ascertaining the limiting number of carbon atoms for each of these phrases, one of ordinary skill in the art would not reasonably be apprised of the scope of the claimed invention (answer, page 10). Additionally, the examiner states that claims 31 and 32 are indefinite because the basis for the weight percentages is not clear (answer, page 10). On the other hand, the appellants submit that the criticized terms at issue in claims 17, 23 and 26 would "reasonably be understood

by one skilled in the art and do not themselves render the claims indefinite" (brief, page 5). Further, with respect to claims 31 and 32, the appellants argue that the "most reasonable basis understandable from the application is in fact the basis of total weight of the composition" (brief, page 6). We disagree with the examiner's conclusions.

The examiner bears the initial burden of presenting a ***prima facie*** case of unpatentability, whether it be based on prior art or on any other ground. ***In re Oetiker***, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). The legal standard for definiteness is whether a claim reasonably apprises those of skill in the art of its scope. ***See Amgen Inc. v. Chugai Pharmaceutical Co. Ltd.***, 927 F.2d 1200, 1217, 18 USPQ2d 1016, 1030 (Fed. Cir.), ***cert. denied sub nom.***, ***Genetics Inst., Inc. v. Amgen, Inc.***, 112 S.Ct. 169 (1991)(citing ***Shatterproof Glass Corp. v. Libby-Owens Ford Co.***, 758 F.2d 613, 624, 225 USPQ 634, 641 (Fed. Cir. 1985)).

Here, the examiner has not provided evidence that one skilled in the relevant art would consider the term "lower

alkyl" or "lower alkoxy" in the present context to be indefinite on its face. Nor has the examiner shown that one skilled in the relevant art would be unable to determine, given the written description found in the present specification, what lower alkoxy or lower alkyl groups would be covered by appealed claims 17, 23 and 26. In our view, the various carbon number limits for the term "lower alkyl" in Sinta and Urano have little bearing on the meaning of "lower alkyl" as used in the present specification, because the prior art references describe these limits in contexts which are different from the present application. Whatever the reasons may be, Sinta and Urano elected to place further limitations on, or to describe a preferred embodiment for, the term "lower alkyl." These further limitations or preferred embodiment in the prior art references do not prove that one skilled in the relevant art would have considered the term "lower alkyl" or "lower alkoxy" to be indefinite in the context of the present application. To the contrary, it seems to us that these further limitations or preferred embodiment described in the prior art references might clarify, rather than confuse, what specific alkyl groups would definitely be considered as "lower

alkyl" groups in the appealed claims. In the claims on appeal, the "lower alkyl" and "lower alkoxy" groups are parts of the photo-induced acid precursor compound, which is described in detail starting at page 5, line 7 of the specification. The appellants do not place any particular criticality on the maximum number of carbon atoms for the "lower alkyl group" or the "lower alkoxy group." Since the appellants have not indicated any upper limits of carbon numbers for the terms "lower alkyl" and "lower alkoxy," the logical conclusion would be that these terms are to be given their broadest reasonable meanings as would be understood by one skilled in the relevant art. ***See***, e.g., ***In re Morris***, 127 F.3d 1048, 1054, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997).

Regarding claims 31 and 32, we agree with the appellants that, based on a reasonable reading of the specification (page 13, lines 5-21), the total weight of the positive photoresist composition can be the only possible basis for the specified weight percentages. For if a different basis was intended, the appellants would have specified such a different basis, as in Murata or Urano.

Accordingly, we cannot sustain the examiner's rejection of claims 17, 23, 26, 31, and 32 under the second paragraph of 35 U.S.C. § 112.

We next turn to the § 103 rejections. Urano discloses a resist material comprising: (a) a polymer having a monomer unit having a functional group which becomes alkali-soluble by chemical change with heating under an atmosphere of an acid generated from a photosensitive compound when exposed to light, a monomer unit having a phenolic hydroxyl group, and, if necessary, a third monomer unit; (b) a photosensitive compound having high transmittance for light of near 248.4 nm and capable of generating an acid by exposure to light or by irradiation (photoacid generator); and (c) a solvent for components (a) and (b)(column 3, lines 19-34). With respect to Urano's polymer (a) and the relative comonomer ratios, ten variables (R^1, R^2, R^3, R^4, R^5, R^6, R^7, k', p', and m) are present for "picking and choosing" (column 2, line 40 to column 3, line 8). The use of styrene as a third monomer is never expressly mentioned (column 3, lines 54-60), much less a copolymer having all three types of monomers in the specific molar ratios as recited in the appealed claims.

Thus, in comparing Urano against the subject matter of appealed claim 1, we find that Urano fails to specifically disclose the appellants' claimed copolymer having the same comonomers in the precise claimed molar ratios and fails to disclose or suggest the use of a dissolution inhibitor having formula (II) as specified in appealed claim 1. To remedy the deficiencies of Urano, the examiner relies on Murata, Sinta and Yamanaka. However, we find that the combined teachings of the prior art references fail to establish a ***prima facie*** case of obviousness within the meaning of 35 U.S.C. § 103.

As pointed out by the appellants (brief, page 12), Murata and Sinta fail to disclose or suggest the appellants' claimed copolymer and the dissolution inhibitor having formula (II). Therefore, it is not apparent to us how these prior art references remedy the deficiencies of Urano.

With respect to Yamanaka, this prior art reference discloses a positive type light-sensitive composition comprising: (a) a resin which is insoluble in water and soluble in an alkaline aqueous solution; (b) a compound which generates acid by irradiation with active rays or radial rays; and (c) an acid decomposable dissolution inhibitor having a

molecular weight of not more than 3,000 and having groups decomposable by the action of the generated acid to increase the solubility of said inhibitor in an alkaline developing solution, wherein said inhibitor (c) is at least one compound selected from the group consisting of (i) compounds having two of said acid decomposable groups which are separated by 10 or more bonded atoms excluding the atoms constituting the acid decomposable groups or (ii) compounds having at least three of said acid decomposable groups, and two of said groups which are at the farthest positions are separated by 9 or more bonded atoms excluding the atoms constituting the acid decomposable groups (page 3, lines 22-33). Although the examiner is correct in stating that Yamanaka's dissolution inhibitor compound 35 (page 25) falls within the scope of appealed claim 1, Yamanaka also describes a large number of other distinct compounds as being suitable dissolution inhibitors. Further, Yamanaka fails to disclose or suggest the same copolymer as recited in appealed claim 1, let alone the specific comonomer molar ratios.

On the basis of these findings, we determine that a significant amount of unguided "picking and choosing" from

more than one prior art reference would have been necessary for one of ordinary skill in the art to arrive at the appellants' claimed subject matter as recited in appealed claim 1. None of the applied prior art references provide any teaching, suggestion, or incentive to select the appellants' claimed copolymer having specific comonomer ratios from Urano and then to combine it with the appellants' claimed dissolution inhibitor having formula (II) from the numerous compounds disclosed in Yamanaka. At best, the references might establish that it would have been "obvious to try" various combinations of known polymers and dissolution inhibitors, including the specific combination recited in the appealed claims. But this is insufficient to meet the legal standard under 35 U.S.C. § 103 because obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. ***In re Geiger***, 815 F.2d 686, 688, 2 USPQ2d 1276, 1278 (Fed. Cir. 1987); ***ACS Hospital Systems, Inc. v. Montefiore Hospital***, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984).

Regarding Ueda, which was applied only against claims 14 and 17, this prior art reference discloses a positive photoresist composition comprising a dissolution inhibitor within the scope of the appealed claims (abstract). However, Ueda does not disclose or suggest the same polymer as recited in the appellants' claims. Nor is there any motivation or suggestion from the applied prior art references to use the appellants' claimed polymer in Ueda or to use Ueda's dissolution inhibitor in a polymer system as specified in the appealed claims. Therefore, Ueda likewise fails to remedy the deficiencies of Urano.

On this record, we are constrained to reverse the examiner's rejections under 35 U.S.C. § 103.

Since the remaining claims are all dependent claims, we need not discuss them separately from appealed claim 1. Also, we need not address the sufficiency of the comparative experiments
presented in the declarations under 37 CFR § 1.132 of Takeyama, because we have determined that the applied prior art references fail to establish a ***prima facie*** case of obviousness.

In summary, the examiner's rejection of claims 17, 23, 26, 31, and 32 under the second paragraph of 35 U.S.C. § 112 is reversed. The examiner's rejection of claims 1, 5-9, 12, 13, 15, 16, 18-33 and 36 under 35 U.S.C. § 103 as unpatentable over Urano in view of Sinta and Murata and further in view of Yamanaka is reversed. The examiner's rejection of claims 14 and 17 under 35 U.S.C. § 103 as unpatentable over Urano in view of Sinta and Murata and further in view of Yamanaka and Ueda is also reversed.

REVERSED

CHUNG K. PAK Administrative Patent Judge	)
TERRY J. OWENS Administrative Patent Judge	) BOARD OF PATENT APPEALS AND INTERFERENCES
ROMULO H. DELMENDO Administrative Patent Judge	)

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